

15

January 5, 1960

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# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



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A SCIENCE SERVICE PUBLICATION

## Kodak reports on:

"Ektalith," a word which will catch on... the stable base of photography... four views of a 1920 Bavarian postage stamp... a polyolefin you can make springs out of

### Camera weds duplicator

There are many thousands of offset duplicators in offices. We have worked out new materials and equipment which enable them to start in two minutes turning out in quantity first-rate enlargements or reductions of anything drawn, written, or printed, including microfilm records. If you require relatively few copies, you don't even need an offset duplicator. Write a note to Eastman Kodak Company, Graphic Reproduction Division, Rochester 4, N. Y., and ask where in your locality you can see a demonstration of the *Kodak Ektalith Method*.

### Wall Street cheery

## Factory Photos

Firms Spur Camera Use  
To Solve Test, Sales,  
Production Problems

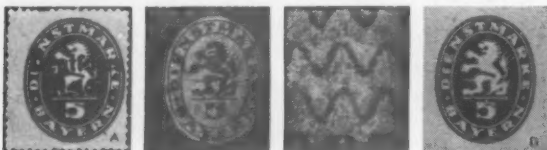
headlined the first column of *The Wall Street Journal* on the penultimate morning of last summer.

"Industry sources expect retail sales of equipment and supplies for industrial photographic use will reach some \$250 million this year, up from about \$100 million five years ago," the story said. (That's a very short time ago. These very discourses have been appearing for six years in this periodical.)

Feeling well disposed toward *The Wall Street Journal*, we laid it aside and took action to maintain the trend. Of "supplies" that *The Wall Street Journal* mentioned, none is older than photographic plates—our original product. For the love of challenge, we decided to get ready for the printer a chart that would put the photographic plate right into the spearhead of photography's onslaught on current technology.

The chart is now ready. You may have a copy with our compliments for your photo department wall. Indicate interest to Eastman Kodak Company, Special Sensitized Products Division, Rochester 4, N. Y. It takes 29" x 16½" to set out enough information about our 75 species of plates to permit industry and technology some intelligent basis for choice. You will receive the chart accompanied by a little pamphlet on dimensional stability entitled "Physical Characteristics of Kodak Glass Plates." Gist of the pamphlet's message: if there were no such thing as the glass photographic plate, it would be necessary to invent it.

### About the new x-ray films



Bavarian stamp of 1920 (Scott No. 052). A. Visible light photograph. The design is green and the "Deutsches Reich" overprint is black. B. Soft x-ray radiograph. Details of both design and paper visible. Design is "negative," indicating absorption of x-rays by the ink. C. Electron radiograph. Only the details of the paper are shown. D. Electron-emission radiograph. The design is "positive," indicating a relatively high

electron emission from some heavy element in the ink. The overprint cannot be seen.

This is a clever scheme to snare the attention of those who use philately for a hobby and radiation for a livelihood. Having gained your attention, we must reward you for it. The reward takes the form of a handsome 24-page book which contains not only a discussion of the above illustrations but (much more important) of general techniques for radiography by emitted electrons, transmitted electrons, soft x-rays, hard x-rays, and gamma rays; and (most important) operating data about the several new and newly improved Kodak films for all manner of radiography and x-ray diffraction.

Request a copy of the Second Supplement to "Radiography in Modern Industry" from Eastman Kodak Company, X-ray Division, Rochester 4, N. Y. To have it make full sense, it helps to have a copy of the book that the supplement supplements. This hard-cover, thoroughly indexed, 136-page affair is sold by x-ray dealers for \$3. If you already own it and have sent in the postcard that came with it, you doubtless have already received and read the supplement and have been wasting your time for the past 90 seconds.

### Big one coming



See what Pioneer Plastics of Jacksonville, Fla., has done with some of our first commercial output from a process we have invented for polymerizing our high-purity propylene.

The polypropylene dawn is breaking. Polypropylene has a significantly lower density than polyethylene.\* A pound of it therefore yields more funnels, beakers, weighing bottles, or anything else—dimension for dimension. It melts higher. It resists stress-cracking better. Its stiffness permits it to hold a vacuum under conditions where polyethylene would collapse. Its resilience permits it to serve as a molded spring to seat a check valve, where a spring of even expensive alloy would still contaminate a reagent.

As yet we are making no excessive noise about Tenite Polypropylene, but inquiries directed to Eastman Chemical Products, Inc., Plastics Division, Kingsport, Tenn. (Subsidiary of Eastman Kodak Company) will elicit adequate replies.

\*Among the uses of Tenite Polyethylene—may their numbers ever grow—we have just heard of one that requires neither molding nor extruding. You just set out 1.5 kg of the raw pellets outdoors over a sheet of polyester in a tray and let them sit there to entrap debris from nuclear detonations as it falls from the sky. Then you wash them with isopropyl alcohol and, by the use of sieves, analyze for fallout. They do a better job than washed pea gravel, quartz sand, glass beads, or several other granular synthetics. Read all about it in *Industrial Hygiene Journal* 20, 267 (1959).

This is another advertisement where Eastman Kodak Company probes at random for mutual interests and occasionally a little revenue from those whose work has something to do with science

Kodak  
TRADE MARK

## ASTRONOMY

# Radio Signals From Planets

**Surprising and unexpected results of radio astronomy research were among recent scientific events reported at the American Association for the Advancement of Science meeting.**

RADIO "messages" from Venus, Jupiter and Mars have allowed exploration of these planets from the earth. Some results have been surprising.

A recently discovered radiation hazard to space vehicles entering and leaving the atmosphere of Jupiter will be roughly a hundred times greater than the hazard of the earth's radiation belts, discovered by satellites, Dr. Frank D. Drake of the National Radio Astronomy Observatory, Green Bank, W. Va., told the American Association for the Advancement of Science meeting in Chicago.

Jupiter is emitting continuously at least three billion watts in radio radiation at frequencies above about 100 megacycles per second. Dr. Drake suggested that this kind of radiation is caused by high energy electrons trapped in Jovian radiation belts similar to the terrestrial radiation belts that may worry future space travelers. The number of trapped particles in the belts around Jupiter may be a million times greater than in the terrestrial belts. The Jovian belts would require for their origin a magnetic field on Jupiter at least ten times stronger than on earth.

Giant antennae forming radio telescopes allow the observation of radio emissions of heavenly bodies. The great new national radio observatory in a sparsely populated West Virginia area is one of the principal receiving posts for this new kind of look at the planets and other heavenly objects.

Jupiter emits extremely strong 20 megacycle radiation that seems to be caused by great electrical storm disturbances in the Jovian atmosphere. This comes from only a few points on the planet and has been observed for about eight years, this year's being less than before, suggesting that solar activity controls this radiation to some extent.

The radio telescope has also observed the hard surface of Venus for the first time. It has a very high temperature, very nearly 585 degrees Fahrenheit, likely caused by the atmosphere acting like a greenhouse, the same effect that keeps the earth warm at night. The variation in surface temperature from day to night is extremely small on Venus.

Because the temperature is very much higher than the expected boiling point of water on Venus, no liquid water is believed to exist anywhere on Venus' surface. Because of absence of water in the liquid state, Dr. Drake believes life is very unlikely on Venus. What water there is on Venus is in the form of vapor in the atmosphere and the planetary surface probably consists of barren rocks and deserts.

Older ideas on Mars have not been changed by radio observations. The radio

emissions from space are, of course, not from artificial sources like our radio stations but are natural and more like static.

Even before explorers from earth arrive on the moon, there can be better lunar maps, D. W. G. Arthur, research associate of Yerkes Observatory, Williams Bay, Wis., told the astronomers.

Moon photographs contain a wealth of detail that has not been translated into maps, Dr. Arthur said, and the photographs have not been used correctly so that the major maps compiled in this century are only low-grade sketch maps. The best lunar map that could be made would still be inferior to a military topographic map compiled from very poor quality high-altitude aerial photography. The best moon photograph is equivalent to a naked-eye view from about 2,000 miles above the lunar surface and a telescopic observer at the best moments obtains an impression equivalent to a view from 600 miles.

Foreseeing the day when space navigators will require a map giving an overhead view



**TEMPERATURE POWER**—A ferroelectric converter, developed at the International Telephone and Telegraph Corporation Laboratories, may be useful to power satellites using heat sources only. Engineer Sigmund R. Hob holds a satellite mock-up: the dark sections of special ceramic coating providing the high-voltage alternating current. Outputs of approximately 1,000,000 volts—AC or DC—are theoretically possible, with outputs of more than 1,000 already achieved.

of each part of the moon's surface, Dr. Arthur outlined ways of achieving new maps that will be incomparably superior to those available today. Optical-mechanical plotting equipment especially designed for the job and based on principles parallel to those used in aerial photography would do the job.

## Youth in Aged Men

AN APPROACH to a pharmaceutical fountain of youth has been achieved by administering androgenic steroid to aged men. A degree of restoration of youthful function, particularly of muscles, has been observed.

Dr. Gregory Pincus, research director of the Worcester Foundation for Experimental Biology, Shrewsbury, Mass., told the Association that the androgen administration alone does not completely restore youthful function in elderly men but it does help bring back some youthful attributes.

The use of the steroid for the treatment of the aged men is based upon the fact that with advancing age the manufacture in the body of steroids declines.

"There may be irreversible age condition changes that cannot be corrected by the steroid treatment and there may be other hormonal deficits," Dr. Pincus suggested.

"We still have no knowledge of age-related changes in the production of other steroidal hormones such as progesterone and aldosterone. Furthermore, the effects of the steroidal hormones upon other hormone producing systems in the body such as the thyroid gland and the pituitary gland yet remain to be explored in elderly subjects.

Dr. Pincus declared that the full role of the hormones as sustainers of youthful metabolic function still remains to be determined.

## Family Life Changing

MARRIED COUPLES will have more than 15 years together after their youngest child has left home, a team of U. S. Bureau of the Census workers predicts for 1980.

Important changes in birth rates, age at marriage and other vital statistics are gradually being reflected in a changed family life, Dr. Paul C. Glick, Dr. David M. Heer and John C. Beresford reported to the American Association meeting.

The full force of the postwar "baby boom" will be felt beginning in about five years: the number of first marriages and the average annual increase in the number of households and families will rise substantially, they said.

Furthermore, relatively more women are having their children before the age of 40. From now into the near future, the researchers predict, the average married couple will have close to one-third of their married life remaining after the last child leaves home. Women will have increasingly more time during which to perform their roles as wife, joint breadwinner, society lady and community servant.

## METROLOGY

# Discuss Metric System

WHETHER INDUSTRY should abandon the inch and adopt the centimeter is being debated. It is being urged that the other units of the metric system widely used abroad and in research laboratories in this country should be used more universally.

Already legal and the prime standard of measurements, the metric system is still not generally used.

Discussions at the American Association for the Advancement of Science, meeting in Chicago, showed that some large industries notably in pharmaceuticals and astronautics favor converting to the metric system. Other areas, notably steel fabricating, automobile manufacturing and gauge manufacturing are opposed.

Vice Admiral G. F. Hussey Jr., managing director, American Standards Association, New York, reported that the discussion tended to support opposition to the conversion.

Most industries that favor the metric system, like pharmaceutical manufacturers, are closely allied to research methods. For instance, Parke, Davis and Company, Detroit, has converted to the metric system with standardization of all weighing and measuring equipment, reduced chances of error, less maintenance, simpler inventory, and full use of electronic data processing.

On the other hand, metal industries, auto makers and similar firms cite in opposing the metric system the cost of the physical changes in drawings and equipment that would be necessary and the loss of skills on the part of designers and workmen accustomed to visualizing in inch dimensions.

Expression of fractions of pounds, pints, etc., in decimals, not in ounces, etc., was favored by Dr. Colston E. Warne, professor of economics, Amherst College, and president, Consumers Union of U.S. Where 3 lb. 2½ oz. now appears on a "giant size" detergent package, it would read 3.16 lb. This would make it easier for a customer to do his arithmetic in choosing the best buys.

The eventual goal in Dr. Warne's opinion would be a switch to the metric system of units, but a step in that direction would be to do what one brand of baby food does, when its label states both kinds of units: 3½ oz., 99 grams.

Dr. Warne suggested that some manufacturers may produce varied and peculiar weights of packages merely to confuse the buyers. On one grocery shelf seven weight packages, ranging from 2 lb. 5½ oz. to 3 lb. 8½ oz. were found all labeled "giant size."

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graph on the cover of this week's SCIENCE NEWS LETTER. Speeds of approximately 3,000 miles per hour at simulated altitudes of more than 100,000 feet will be created using what is described as the largest rotating machine ever built.

Two 83,000 horsepower motors as well as two smaller "starting" motors of 25,000 horsepower each, built by the Westinghouse Electric Corporation, supply the power.

The scaffolding supports workers who are installing the layer of insulation material that will absorb temperatures as high as 650 degrees Fahrenheit.

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## ARCHAEOLOGY

# Ancient Winery Found

A WINE-MAKING plant, complete with storage space for a total of 30,000 gallons of wine, has been found near the famous well of Gibeon, at the modern village el-Jib, Palestine.

The 2,600-year-old winery, probably the oldest in the world, was discovered when handles from wine jars found in the well suggested further investigation. Each handle bore the name and address of the maker of the wine, indicating that ancient Gibeon was a wine industry center.

In the course of excavation, 38 unusual vats were found cut out of limestone bedrock. Each one has a small opening of about 29 inches in diameter that could be covered with a stone. Each measures about six feet in diameter and averages seven feet, four inches in depth. The scientists decided they had served as cellars for storing and aging the wine.

Hundreds of broken pieces from storage jars were found in one cellar. In another, which had been covered by a stone, a whole jar was found. Here the wine could be kept at a temperature of 65 degrees even during the hottest part of Palestine's summer.

A number of funnels, found in the cellars, had apparently been used for transferring the wine from larger jars into smaller ones for export. Stoppers for the jars also turned up, but the scientists who excavated the area were reasonably sure

these could not have provided the air-tight seal necessary to keep wine from spoiling while in storage.

A wine maker at a nearby monastery provided a possible answer. If olive oil is poured on top of wine in a jar or bottle, a seal is provided, he said. The finding of two olive presses on the site confirmed this answer. Wine presses, dipping basins and stone troughs were parts of the wine-making equipment found.

The expedition to Gibeon was sponsored by the University Museum of the University of Pennsylvania, Philadelphia, under the direction of Dr. James B. Pritchard. His report appears in *Expedition* (2, 17, Fall, 1959).

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## ENGINEERING

# Supersonic Wind Tunnel Nearing Completion

See Front Cover

A HUGE supersonic wind tunnel is now nearing completion at the Arnold Engineering Development Center at Tullahoma, Tenn.

The tunnel, a key facility for testing space vehicles, missiles, propulsion systems and components, has a diameter of about 55 feet at the point shown in the photo-

## ASTRONOMY

# Plan Satellite-Telescope

A two-ton satellite with a 36-inch telescope will be launched within the next few years for star tracking. It should operate for at least one year without equipment failure.

UNITED STATES PLANS for observing the moon, planets, sun and the entire universe beyond the solar system from earth-circling satellites have been reported.

Dr. Nancy G. Roman of the National Aeronautics and Space Administration, Washington, said a "major undertaking" will be the launching, within a few years, of a two-ton satellite with an optical telescope 36 inches in diameter, capable of tracking stars very accurately. In the relatively near future, she told the American Astronomical Society meeting in Cleveland, U. S. space scientists plan to obtain a good lunar map.

The director of Princeton University Observatory, Dr. Lyman Spitzer Jr., outlined the problems of operating a large telescope in a satellite orbit. He said the problems of launching, communication and remote control are common to all satellites.

A large astronomical telescope in a satellite, however, must also be capable of being set with pinpoint accuracy at any desired region of the sky, despite sharp temperature changes produced when the satellite enters the earth's shadow and then re-emerges into full sunlight.

Dr. Spitzer also pointed out that an unmanned observatory should operate for at

least a year before equipment fails. He said the equipment being studied by the Princeton group includes a quartz telescope mirror 24 inches in diameter to be used for analyzing the ultraviolet starlight that does not penetrate through the earth's atmosphere.

For temperature control, a two-chamber satellite is planned. The telescope would be rotated by electromagnetic forces acting on an "inertial sphere," a hollow aluminum ball 16 inches in diameter suspended in space by a magnetic field and rotating without any friction. By the principle of reaction, he explained, when the sphere is rotated one way, the telescope rotates the other way.

The side of the satellite warmed by sunlight could contain most of the electronic equipment, tape recorder and a transmitter. The other side, insulated to a cool minus 100 degrees Fahrenheit, would contain the telescope, spectroscope and photoelectric detectors that operate most effectively at low temperatures.

The general direction in which the telescope points would be determined by measurements of the light from the sun and of the earth's heat radiation. To obtain the required accuracy in aiming the telescope,

television pictures of the sky, relayed to ground observers, could be used.

Dr. Herbert Friedman of the U. S. Naval Research Laboratory, Washington, said past rocket and satellite information indicate it will be "extremely important" in future astronomical experiments to introduce some way of eliminating the effects on instruments of particles in the earth's natural radiation belts, which are believed a hazard to future space travelers.

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## ORNITHOLOGY

## Transplanted African Bird Mates in Winter

TAKE A WEAVER FINCH from his home in Africa, bring him to Iowa and you will find he starts his love-making preparations some six months later than American birds.

Fall and winter, not spring, is the nuptial season for the African birds, two zoologists reported to the American Association for the Advancement of Science meeting in Chicago.

Male birds acquire their brilliant cock plumages in the fall season. Size of the sex gland and breeding activity reach a maximum about September, with the mating season sometimes extending through December.

Evidently the harmony between seasonal changes in molts, plumages, and primary sex characters is brought about by glandular control, Drs. J. P. Thapliyal and Emil Witschi of the State University of Iowa reported. In the caged African birds, their hypophysis gland or pituitary body, is slowly stimulated by long summer days until enough hormone is released to stimulate initial growth of the sex glands. However, the researchers pointed out that maximum sex development follows only as day length decreases.

These birds have now become "laboratory animals," serving in the analysis of normal and pathological hormonal conditions, Drs. Thapliyal and Witschi explained. The intricate pattern of complex hormonal interactions is mirrored spectacularly in their external appearance.

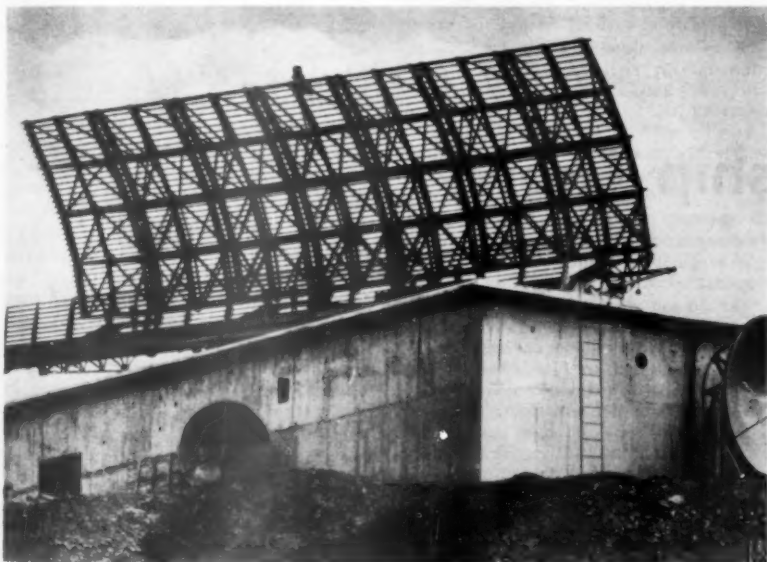
## Constant Mates for Life

DIVORCE RATE among the chimney swifts appears to be very low.

Some 150 birds that had been banded were studied for more than ten years, Dr. Ralph W. Dexter of Kent State University told scientists at the Association meeting. The majority of the chimney swifts had only one or, at the most, two mates for life. Nesting records range up to 13 years, he said.

Few birds change mates each year or two, Dr. Dexter explained. Several swifts remated with their former mates after nesting with another bird in the interval. Only three birds had two mates in one season. A few birds shift about from one possible mate to another before nesting for the season.

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**HIGH POWER RADAR**—A high power (500 kilowatt), 50-centimeter radar installation has been officially opened at the Wellington, New Zealand, airport. Two microwave "dish" aerials are seen at the base of the building. Received radar signals are also sent by microwave radio link to the airport and by a separate radio path to the airways control center for display on the radar screens.

## VITAL STATISTICS

# Marriage Statistics Due

AMERICA will have better figures on marriages and divorces as the result of plans being put into effect for 1960 by the National Office of Vital Statistics.

To fill in the gaps due to nine states without marriage central files and 15 states without divorce central files, sample records in those areas will be obtained from local officials who have the records. Then these results will be applied by modern sampling methods to give reliable figures that can be used by social scientists, market analysts, population experts and others.

Many countries have marriage and divorce data more complete than the United States. Dr. Hugh Carter of the Government's National Office admitted to the American Association for the Advancement of Science in Chicago. The new program will allow U.S. marriage and divorce figures to be compared with international records. The needs of hundreds of users of information on family formation and dissolution will be further met by a campaign to extend the registration area to uncovered states.

## Soviets Lagging in Computers

Top priority is being given in the U.S.S.R. to the education of scientists to design and use more than two billion rubles of electronic information processing digital computers to be built each year until 1965, John W. Carr, III, of the University of North Carolina Computation Center, reported.

Moscow State University is training more than 200 graduate students, many of whom will be sent to Siberia next year to work with large-scale computers at Novosibirsk.

Nevertheless, the Soviet computers do not compare in size and speed with those announced in the United States. In artificial

intelligence and automatic programming, methods for making machines perform mentally like human beings, the Soviets seem to be lagging behind the West. There is, however, a journal on cybernetics in Russia. The U.S.S.R. is behind the U.S. in data processing, although Mr. Carr warned that there is danger in the present discouragement by mathematical academicians of participation in the area of computers and information machines.

## Shock Improves Later Growth

Violent shaking, electric shock and handling of infants when they are very young speed up body development, produce resistance to disease, brain injury and seizures, Dr. Seymour Levine of the Ohio State University, Columbus, told the Association. At least this is true for rats and mice, the animals upon which he experimented.

## Decimals Help Children

Children even as young as the first grade have no trouble in understanding and using the decimal system, Mrs. Lore Rasmussen and David A. Page of the University of Illinois Arithmetic Project reported. Mrs. Rasmussen, who is the wife of the principal of Miquon School, Miquon, Pa., has found that children have no difficulty in acquiring a working knowledge and intuitive feel for decimals and the metric system, becoming bilingual in measurement. She suggested that even if centimeters are not used, the inch could be divided in ten parts and decimals used, although the meter is already internationally established.

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# Home Ownership Grows

THE 1960 census is expected to show that 62% to 63% of all American families own their own homes.

This estimate from a Census expert represents about an eight percent gain over 1950 when figures showed 55% owned their own homes.

Census experts reported to the American Statistical Association, Washington, that the 1960 Census will be improved in ways to make its figures more revealing as to the social health of the nation.

James H. Rose and Dr. Paul C. Glick said the U. S. probably will gain 1,000,000 more "dwelling units" because of a change in definition. In 1960, a dwelling unit will be one room or more having direct access from the street or a common hall, or having cooking equipment. In 1950, two or more rooms were required by definition. Many of these new dwelling units will be rooms in rooming houses. Also to be tabulated in 1960 will be permanent hotel

residences and staff quarters in institutions.

F. S. Kristoff told the Association that a special effort will be made in the 1960 Census to get an accurate picture of new construction, the conversion of single dwelling units into multiple units, the merging of multiple units into single units, the number of house demolitions a year, how fast existing houses are being improved with new facilities, and how many people are switching from house owners to renters, and vice versa.

Some of these topics have never been accurately measured before. In new construction, for instance, Bureau of Labor Statistics figures showed 1,200,000 houses built in 'one year, but Census figures indicated 1,600,000 had been built. It has been estimated that 100,000 to 500,000 houses are being demolished each year, and a 1956 National Housing Inventory indicated the figure is probably around 400,000.

Between 1950 and 1956, about 3,000,000

houses were upgraded from substandard condition into standard, but Mr. Kristoff said this could simply mean that some minor improvement had been made, such as the addition of a water heater. There is no substantial house upgrading going on now in slum areas, he told SCIENCE SERVICE, except in certain "strategic" housing areas such as in fashionable areas of New York City, Washington and other large cities.

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## ENGINEERING

## Dry-Land Ocean Will Test Underwater Cables

A MAN-MADE, dry-land ocean with an environment similar to that found about two miles below the surface of the sea, is being built at Chester, N. J., by Bell Telephone Laboratories engineers.

It will be used to determine whether underwater cables resting on the ocean floor undergo an aging, which accounts for minute changes in electrical characteristics.

If cables do age, the engineers want to know the magnitude of aging, why it takes place and what physical changes in the cable constitute that aging. To help them arrive at these answers, they will subject cables to tests in the simulated ocean for a period of five to ten years.

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## FOOD TECHNOLOGY

## New Automated Process Extracts More Sucrose

AN AUTOMATED process for extracting sugar from cane enables 96% of the sucrose to be extracted. This is six to eight percent more than is obtained by conventional methods.

Described as the "first significant development in the sugar cane industry in more than a century," the process can reduce capital costs by 25% and extraction costs by more than 10%. It requires no building, and less space, operating personnel and maintenance than a conventional mill.

The process is being made available for commercial application in a program planned by the Chemetron Corporation, Chicago, and the J. G. White Engineering Corporation, New York.

The conventional method of extracting sugar from cane involves the squeezing or crushing of cane to release the juice. In this method as much as 10% of the available sucrose is lost and the resulting juice has a purity seldom greater than 85%.

In the new process, sugar cane pieces are fed continuously into the bottom of a tower. As the cane is automatically moved upward mechanically, water moves downward and sucrose is extracted from the cane by osmosis and dialysis, a process of diffusion.

The extracted solution is cleaner than milled cane of like quality, having a purity one to three percentage points higher.

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## PHYSIOLOGY

# Stress Boosts Cholesterol

THE MANNER in which high tension living boosts the body's cholesterol count to a dangerous level has been suggested by the research of two scientists.

Excessive amounts of cholesterol in the blood, long associated with the formation of atherosclerosis, can be caused by overactivity of the adrenal glands which, in turn, is stimulated by stress.

Drs. Eleazar Shafir, a visiting scientist from Israel, and Daniel Steinberg, chief of the National Heart Institute's metabolism section, experimented with dogs. They found that the animals exhibited a powerful fat-mobilizing pattern of hormone activity which involves secretions of the inner core (medulla) and the outer "rind" (cortex) of the adrenal.

It is a well-known fact that stress can cause overactivity of both of these sections of the adrenal glands which are the size of a prune and located atop the kidneys. It was not previously known, however, that the glands' secretions, accelerated by stress, could increase the amount of cholesterol and other fatty substances in the blood.

The secretions responsible for the increase

were found to be adrenalin, the hormone excreted by the inner adrenal during intense emotional excitement, and cortisone, the steroid excreted by the adrenal cortex in response to heat and cold, injuries, infections and other stresses.

Adrenalin injections alone were found by the physician-biochemists to be capable of raising the blood cholesterol and other lipids in normal dogs. But when the dogs were deprived of their normal cortical secretions, by removing their adrenal glands, this effect of the adrenalin injections was lost. When the cortisone injections were used to "replace" the missing cortical secretions, the fat-mobilizing potency of the adrenalin was fully restored.

The fat-mobilizing action of this combination of adrenal "stress hormones," as seen in dogs, is strong enough to suggest the possibility of a direct cause-and-effect relationship between adrenal overactivity and the rise in blood lipids seen in various studies of men subjected to disturbing emotional experiences or sustained high-level job performance at a forced pace.

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a mining operation. For example, a worked-out quarry has been filled with water and made into a recreation area. In Fresno, an adobe brick operation also helped level the ground for irrigation. Recovering resources does not need to mean destruction to good farmland. It is possible to strip off the top soil and "bank" it until the operation is completed, at which time the soil can be replaced.

Science News Letter, January 9, 1960

## MEDICINE

## More Lung Cancer Than TB in Middle-Aged Men

THE INCIDENCE of lung cancer is now twice as great among middle-aged men as tuberculosis is. Once a leading killer, TB is curable in a majority of cases, while lung cancer is rarely cured.

This was indicated by a long-term study by Drs. Katherine R. Boucot and David A. Cooper of the Philadelphia Pulmonary Neoplasm Research Project.

Six years ago 6,137 men over 45 agreed to have annual or semiannual chest X-rays and to answer questions about symptoms of lung disease. Because only about five percent of lung cancer patients survive five years, the researchers hoped to detect lung cancer at the earliest possible stage and determine whether in these early cases they could increase the present low cure rates.

During an average period of six years, 31 men developed lung cancer. Over the same period, 16 men developed tuberculosis, and an additional eight former TB patients showed reactivation of the disease.

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## DEMOGRAPHY

# Population Hits Resources

SHOCK WAVES from today's population explosion are being felt in the United States.

Outwardly it may appear only that cities are becoming larger. This is evidenced by a steady march of suburbs farther from the downtown hub.

But other things are happening, too. This urban growth is quietly locking up some of the nation's treasures in natural resources.

In California, for example, the problem is considered so serious that strong action has been taken in a few instances to protect valuable natural assets. California gains about 500,000 persons a year.

These families require the usual new roads, houses, stores, industrial and municipal facilities. The buildings themselves require such raw materials as sand, gravel, crushed stone, limestone, cement and gypsum. Hundreds of thousands of tons of these building materials are used every month in California. But, as pictured by Harold B. Goldman, the California Division of Mines sand and gravel expert, here is what is happening:

Producers of these low-cost raw materials at first start working suitable deposits close to the consuming areas. Haulage is a significant cost factor. But the expanding community finally engulfs the mining operation.

The new residents consider the operation a nuisance and bring pressure on civic leaders for ordinances to govern load, speed and routes of trucks, to limit the producer's hours of operation and to force him into dust-control measures. Under these harassments, the operator usually moves out.

Once he could find other good sources of clay, rock and gravel within economical hauling distance. But now these deposits have been depleted or submerged by urban expansion. Raw materials are now imported from as far as 40 miles away with the consumer paying the bill.

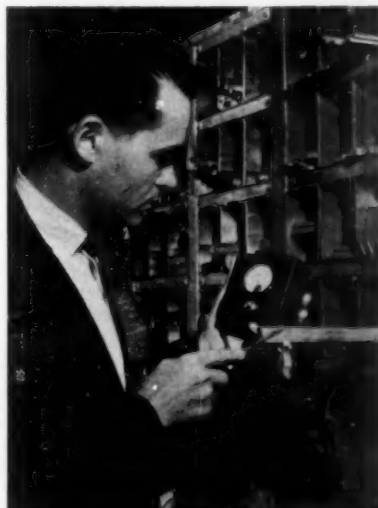
An additional haul of ten miles, Mr. Goldman estimated, adds about 50 cents (about 25%) to the cost of a ton of gravel. Often the material is of poorer quality, so the new houses cost more, are inferior, and have higher maintenance costs.

Many undeveloped mineral deposits are now ringed by population centers and cannot be exploited owing to the difficulty of hauling materials through these communities.

Alarmed at the subtle but insidious effects of its explosive population growth, Santa Clara County implemented a hard-boiled plan to protect agricultural land from the onslaught of urbanization. In 1958, it set aside 40,000 acres in "greenbelts" zoned exclusively for farm use. No factories or stores are allowed.

In Los Angeles, consulting engineers were called to study sand and gravel resources in the San Fernando Valley. Areas suitable for production have been firmly zoned as gravel-pit sites. After depletion, they are to be restored for home sites.

Pits and quarries can be made more acceptable in a community through camouflage using a protective strip of trees and shrubs to make a park-like area. On occasion, unusual by-products are obtained from



**METAL SORTER**—A "metal sorter" has been invented by George Martin of the General Electric Company that identifies different look-alike metals commonly used in nuclear reactors. The device is basically a milliammeter with a single clamp-on lead and another lead with a carbon steel file on the end.

## ZOOLOGY

**Why Microorganisms Send Out Streamers**

TWO ZOOLOGISTS have offered an explanation for the mysterious force behind tiny streams of protoplasm which certain microscopic organisms send out in quest of food.

The discovery, by Dr. Theodore L. Jahn and Robert A. Rinaldi of the University of California at Los Angeles, may lead to a reclassification of an important segment of the world of one-celled creatures.

In the microscopic world vast numbers of tiny creatures which are little more than blobs of protoplasm maneuver around in quest of food, as most living things must. Some of them send out tiny streamers in all directions.

The forces that propel such streams of protoplasm have never been precisely understood by scientists. One proposed mechanism is a pressure system involving contraction of plasmagel tubes. This seems to fit movement of amoebae and has been generally accepted for all similar organisms.

The UCLA zoologists have found that some of these creatures, a type of microscopic marine organisms known as *Foraminifera*, which live in shells and send out protoplasmic streamers through holes in the shells, apparently do not have gel tube systems.

Their observations have suggested that a longitudinal shearing or parallel displacement force located between adjacent surfaces of two gel threads may propel protoplasmic streams of these organisms and several other types.

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Many scientists have for many years tried to show a link between solar activity and some aspect of the weather, such as rainfall or pressure changes. Most such attempts have been unsuccessful.

The low pressure areas affected by the solar activity, Drs. McDonald and Roberts

reported, enter or are formed in the Gulf of Alaska-Aleutian Islands area on the second, third or fourth days after the start of particle emission from the sun. The changes in the low pressure areas occur from a few to several days later and in different locations.

The probability that these changes occur by chance for the three half-years grouped together is less than one in a million. Drs. McDonald and Roberts told the American Astronomical Society meeting at Case Institute of Technology, Cleveland, Ohio.

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Slight anatomical defects of the speech mechanism, such as excessive adenoidal tissue or subtle malfunctioning of the soft palate, are often difficult to detect by conventional diagnostic techniques, the UCLA group pointed out. Study of the movies will, however, often reveal such defects.

Thus the cinefluorographic techniques have enabled the speech therapist to observe the progress of the patient and aid the surgeon and orthodontist in deciding whether surgical and dental reconstructive procedures may help the patient to attain a more normal speech development.

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**Some Children Learning To Read Before Age of 6**

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Children could teach each other, she has concluded. In more than half the homes where a child learned to read prior to the first grade, an older brother or sister acted as tutor.

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The minor meteor streams appear to come from a very broad area and have very low hourly rates. Drs. Hawkins and Southworth told the American Astronomical Society meeting in Cleveland, Ohio, the streams had undergone more aging than the well-known streams.

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Its isolation by doctors working at Oxford, England, and in Somerset marks an advance in the antibiotic field. In laboratory tests it has killed many of the organisms, notably staphylococci, which have recently developed immunity to penicillin. The rapid build-up of this resistance has been alarming doctors everywhere and has led to a sharp rise in hospital infections.

The drug is closely related to the penicillin family but has a different chemical structure. It was first discovered in sewage effluent in Sardinia, the Italian island in the

Mediterranean, but is now being produced synthetically in England.

The basic work on the new drug has been done by scientists under Prof. Sir Howard Florey and Dr. E. P. Abraham, of the pathology and bacteriology department of Oxford University, and by the Medical Research Council's research station at Clevedon, Somerset, under B. K. Kelly. Additional work on it was done by the Oxford X-ray crystallography unit under Mrs. Dorothy Hodgkin.

"The cephalosporins have been known for several years," said J. C. Duckworth, who recently succeeded Lord Halsbury as managing director of the British Government's National Research Development Corporation.

"Many antibiotics have been isolated from the general group and the C one is believed to have the most possibilities. The development of the new drug will not be held up by any shortage of cash," Mr. Duckworth promised.

Tests on animals have proved completely successful and similar tests on human beings are to start almost at once, Mr. Duckworth said. Already two companies, Glaxo Limited and the Distiller Company, are investigating the possibilities of large-scale commercial production of it.

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The person whose hearing gradually decreases is often unaware that he has lost these bridging background sounds. He has a feeling of loss and a sensation that the world is dead, explained Dr. Busse, who is a professor of psychiatry and director of the Center for the Study of Aging. An increase in the level of background noises to help elderly individuals maintain contact with reality may be advisable, Dr. Busse suggested.

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## PUBLIC HEALTH

# January, the Month of March

January is the month of March of Dimes. Contributions to the National Foundation will be directed toward research not only in polio and viruses, but birth defects and arthritis.

By HELEN BUECHL

JANUARY BECAME the month of march 22 years ago.

For it was on Jan. 3, 1938, that the National Foundation for Infantile Paralysis was incorporated. Five months earlier, President Franklin D. Roosevelt, himself crippled by polio, had called for the creation of such an organization. Eddie Cantor suggested that the annual drive for funds be called the March of Dimes.

The President's birthday, which fell on Jan. 30, was chosen as the windup date for the annual March of Dimes campaign. The entire month of January has, ever since, been devoted to raising dimes and dollars that would eventually find their way into research laboratories and hospitals. Thus began the fight against polio.

On April 12, 1945, with World War II drawing to a close in Europe, Franklin D. Roosevelt died. Exactly ten years later, to the day, the Salk vaccine was pronounced safe, potent and effective after being tested in field trials on 1,830,000 school children.

By December of the following year, 1956, more than 45,000,000 persons had received one or more shots of vaccine; polio cases dropped 61% from the pre-vaccine average. Dimes and dollars from Mr. and Mrs. U.S.A. had polio on the run. Since then, the vaccine has been given to more than 80,000,000 persons.

## Polio Statistics

Today, the organization that spurred the drive for polio funds is known simply as the National Foundation. A March of Dimes campaign is still conducted each January and a portion of this money is allocated to the care of those persons who are crippled.

More than 55,000 polio victims still get patient aid from the March of Dimes. Most of these were stricken in previous years.

Some 10,000 new patients were added in 1958 and 1959 as a result of the outbreaks in Des Moines, Kansas City, Detroit, Virginia, West Virginia, New Jersey and other areas.

Despite these statistics, more than one-half of the U. S. population, or 91,500,000 Americans, have had no Salk vaccine. One-fourth of all children under five, the hardest hit of all age groups, are completely unvaccinated. More than 11,000,000 youngsters under 20 are equally unprotected.

Another portion of the funds supports work in another area of polio . . . the live virus vaccine.

Dr. Salk's vaccine contains killed polio

viruses. It offers between 70% and 90% effectiveness. But many researchers believe that a vaccine containing live viruses will offer better protection.

One such researcher is Dr. Albert Sabin of the University of Cincinnati. His live polio vaccine has been fed with a perfect safety record to more than 6,000,000 Russians. Several groups are already interested in manufacturing such a vaccine for the public, but no live-virus polio vaccine has yet been licensed for use in the United States.

In addition to cleaning up the polio problem, the Foundation is now tackling two

other problems, birth defects and arthritis.

For instance, one out of every 16 babies born in the U. S. has one or more significant congenital malformations, defects that occurred before birth. This means that every year, 250,000 babies in this country have at least one deformity before they are born. Of these, 34,000 infants are stillborn or die in the first four weeks of life.

The causes of birth defects are mainly unknown. Some result from imperfect germ cells. Others, however, stem from injuries to the embryo within the mother's body, particularly within the first three months of growth. These can sometimes be prevented by knowledge and precautions.

These precautions include: avoidance of exposure to German measles during early pregnancy, extensive X-ray treatment, powerful drugs and medications during pregnancy, and abrupt altitude changes. It is



**AN "OUCH" OF PROTECTION**—A little girl from Arkansas, shown in this National Foundation photograph, gets her protective shot of polio vaccine, the result of many years of research and many dimes and dollars contributed in the annual campaign for funds.

also extremely important to develop what doctors call "good maternal soil" by maintaining a diet rich in proteins, vitamins and minerals.

Another portion of each dime contribution will be directed toward research in arthritis. As in birth defects, the causes of arthritis and the rheumatic diseases are mainly unknown. Targets of research in this area include development of techniques for earlier diagnosis so that corrective treatment may be started sooner; new methods of treatment and rehabilitation to prevent or correct deformities; new drugs for relieving pain and inflammation; basic research into causes of connective tissue diseases and a better understanding of the role played by the rheumatoid factor, found in the blood of arthritis patients.

Arthritis is a group of painful, disabling diseases, mainly affecting the joints. There are no known cures or preventives. This disease cripples more persons than any other chronic disease.

It is estimated that more than 11,000,000 persons are afflicted with arthritis and rheumatic diseases. This includes persons of all ages, including children and infants.

There are two major types of arthritis, rheumatoid and osteoarthritis. Rheumatoid arthritis is a severe form of the disease, manifested by inflammation, swelling, fever, loss of weight and limited joint movement. This type of arthritis strikes three times as many women as men.

### More Research Needed

Osteoarthritis is a degenerative disease of the joint surfaces. Some 80% to 90% of all persons more than 60 have it in varying degrees. It results in pain, stiffness, and sometimes, deformities. It afflicts hands, arms, shoulders, back, hips and knees.

Therefore, it becomes apparent that there is yet much research to be done in the fields of birth deformities and arthritis in addition to polio. In 1958, the National Foundation (formerly "for Infantile Paralysis") expanded into research on arthritis and birth defects.

Extensive research is continuing in the field of polio and related viruses. At the close of 1959, the Foundation had these gains to report:

More than \$1,000,000 has been invested by the Foundation for research in birth defects and arthritis alone. There have also been some dividends in 1959 from past investments. For instance, two scientists, working separately, have turned up clues to what leads a virus to attack some cells but not others. The work paves the way for further study on how to defend cells from virus invasion.

Another Foundation grantee found that certain Coxsackie viruses cause pericarditis, inflammation of the heart's outer lining. This news indicates that some Coxsackie viruses may be of still more significance as a cause of damage to the heart and other vital organs.

In Chicago, a husband and wife team report that in some cases of common childhood diseases, such as measles, the brain may be damaged without showing immediate ill effects.

Science News Letter, January 9, 1960

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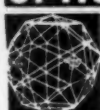
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**EMOTIONAL FORCES IN THE FAMILY**—Samuel Liebman, Ed.—*Lippincott*, 157 p., \$5. Study of the emotional interrelations between the patient and the most important individuals in his immediate environment.

**EXPERIMENTS IN ELECTRONICS**—W. H. Evans—*Prentice-Hall*, 374 p., illus., \$6.95. One hundred experiments on fifty different subjects for introductory electronic courses.

**FEDERAL FUNDS FOR SCIENCE, VIII. The Federal Research and Development Budget Fiscal Years 1958, 1959, and 1960**—Mildred C. Allen and others—*National Science Foundation (GPO)*, 74 p., illus., paper, 45¢. Data on the nation's investment in research and development.

**FERRITES: Physical properties of ferrimagnetic oxides in relation to their technical applications**—J. Smit and H. P. J. Wijn—*Wiley*, 384 p., illus., \$10.

**THE FIRST BOOK OF ASTRONOMY**—Vivian Grey, illus. by George Geygan—*Watts*, F., 68 p., \$1.95. A well presented history of the earth, with informative diagrams.

**FROM BONES TO BODIES: A Story of Paleontology**—William Fox and Samuel Welles—*Walck*, H. Z., 118 p., illus., \$3. A clearly written text for young readers.

**GUIDE TO THE SPACE AGE**—Compiled and edited by C. W. Besserer and Hazel C. Besserer—*Prentice-Hall*, 320 p., \$7.95. It presents the terminology of space technology with the purposes of standardizing the specialized language and make it understandable to the lay person.

**HANDBOOK OF INDUSTRIAL RESEARCH MANAGEMENT**—Carl Heyel, Ed.—*Reinhold*, 513 p., illus., \$12. Brings together practices of organization, evaluation and control of industrial research.

**INSTRUCTIONS TO YOUNG ORNITHOLOGISTS: Bird Biology**—J. D. Macdonald—*Museum Press (Sports Illustrated)*, 128 p., illus., \$3.75. A brief outline of the life of birds including such features as courtship, migration, internal anatomy, etc.

**INTRODUCTION TO HIGHER MATHEMATICS FOR THE GENERAL READER**—Constance Reid—*Thomas Y. Crowell*, 184 p., illus., \$3.50. Basic concepts presented clearly and directly.

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**INTRODUCTION TO RUBBER TECHNOLOGY**—Maurice Morton, Ed.—*Reinhold*, 547 p., illus., \$10. A series of lectures intended to introduce new members of the rubber industry to the basic aspects of rubber technology.

**LAND ACQUISITION 1959**—David R. Levin and others—*Highway Res. Bd., Bull.* 232, 123 p., illus., paper, \$2.40.

**THE MICROCIRCULATION: Symposium on Factors Influencing Exchange of Substances Across Capillary Wall**—S. R. M. Reynolds and Benjamin W. Zweifach, Eds.—*Univ. of Illinois Press*, 170 p., illus., \$4.50.

**NORTH AMERICAN WATERFOWL**—Albert M. Day, sketches by Bob Hines—*Stackpole*, 363 p., \$5.75. Story and problems of waterfowl management.

**OUT OF NOAH'S ARK: The Story of Man's Discovery of the Animal Kingdom**—Herbert Wendt, transl. from German by Michael Bullock—*Houghton*, 464 p., illus., \$6.50.

**PHYSICS OF THE ATOM**—M. Russell Wehr and James A. Richards, Jr.—*Addison-Wesley*, 420 p., illus., \$8.50. An extension of the introductory college physics course into the realm of atomic physics.

**SEEING THE EARTH FROM SPACE: What the Man-Made Moons Tell Us**—Irving Adler—*John Day*, 160 p., illus., \$3.50. Material on the findings made by earth satellites and background material from the author's earlier book, *Man-Made Moons*.

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Science News Letter, January 9, 1960

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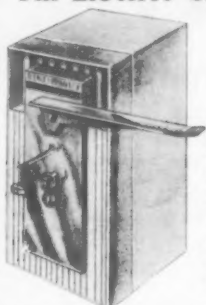
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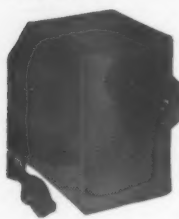
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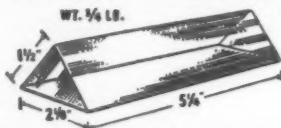
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Science News Letter, January 9, 1960

### ENGINEERING

## Vibrationless Hammer Neglected Invention

**ANOTHER** instance of American priority over Russian technology has come to light, except that United States ingenuity made the discovery but industry has not yet picked it up.

It is a vibrationless pneumatic hammer suitable for riveting and pavement breakers that will not shake the stuffings out of the operator and cause vibration sickness, characterized by loss of hearing, vision, blood vessel spasms and bone and joint damage.

Approximately a decade ago the Armour Research Foundation of the Illinois Institute of Technology, Chicago, developed a vibrationless pneumatic hammer principle that could be applied to commercial vibration tools. But there were no commercial takers interested in applying it to pneumatic reciprocating tools.

Russians are concerned, according to translated reports, about the danger of vibration and called for study on its effects.

Now the Armour Research Foundation engineers are wondering if the Russians will use the results of their early development work before demand for major pneumatic tool design improvements to protect workers' health causes U. S. manufacturers to take the financial risk necessary to apply them.

Science News Letter, January 9, 1960

## Questions

**ARCHAEOLOGY**—How did some ancient wine makers probably keep their wine from spoiling? p. 20.

**ASTRONOMY**—What is the closest estimate of the surface temperature of Venus? p. 19.

**PUBLIC HEALTH**—How many persons are estimated to suffer from arthritis and rheumatic diseases? p. 27.

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# New Machines and Gadgets

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 1021. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

**DOG CONDITIONER** is said to be a pleasant-tasting, non-toxic powder formula that is mixed with the dog's daily food to help rid it of tape, round, hook and pin worms. It is also claimed to promote a glossier coat, more vitality, improve appetite and a sweeter breath.

Science News Letter, January 9, 1960

**TEST TUBE CAPS** of non-wettable polyethylene may also be used for centrifuge tubes. Flexible outer skirts on the caps also allow the tubes to fit into the top of the plugs. The caps are made in a variety of sizes.

Science News Letter, January 9, 1960

**RECESSED LIGHT FIXTURES** are incandescent units with frameless designs featuring high thermal-resistant plastic diffusers that do not warp, distort or discolor. They are available in three types and utilize 100-watt or 150-watt lamps.

Science News Letter, January 9, 1960

**BIRD FEEDER**, shown in the photograph, which can be hung through a lid eyelet, consists of a top and bottom of rigid polyethylene and a seed container of a softer transparent polyethylene. The top may be unscrewed from the container for refilling. As birds eat off the bottom tray,



more seed falls out of three openings in the seed container, keeping the tray constantly full. Drain holes in the tray keep the seed from getting soggy.

Science News Letter, January 9, 1960

**COLANDER** for washing vegetables and draining and storing food is made of lightweight high-density polyethylene. Unaf-

ected by extremely hot or cold water, it has fullgrip handles and four sturdy legs for use on many types of working surfaces. It comes in red, yellow or white.

Science News Letter, January 9, 1960

**ELECTROMAGNETIC COUNTER** displays six digits in a case slightly more than two inches wide. Operating on a power consumption of about six watts, the non-reset counter may be applied wherever there is a need for a low speed, limited-life unit of minimum initial cost, yet with rugged reliability.

Science News Letter, January 9, 1960

**BATTERY BOOSTER KIT** consists of a rubber-tired tote cart, battery box, battery tongs, and clamps and cables. It provides for easy transport of batteries and speeds up battery servicing.

Science News Letter, January 9, 1960

**FURNACE FILTERS** for hot air heating systems are available in six sizes. They feature all-aluminum frames, non-corrosive construction and plastic filters that remove dirt, dust and impurities from the air without the need for oil or excessive care. Claimed also to remove a good deal of pollen from the air, they may be cleaned by flushing under running water.

Science News Letter, January 9, 1960



## Nature Ramblings



By HORACE LOFTIN

'Coon in the Dark

**PROWLING** through the woodland night, the raccoon finds its way along intricate pathways with the ease of a man walking along a busy sidewalk at high noon. Few items of food along the darkened trail escape its notice, even on the blackest night. Keen eyes, especially adapted for nocturnal vision make use of every stray glimmer of light. But more than this, the animal's senses of smell, hearing and touch act like bright beams that probe the obscurity to show what lies ahead.

Just how much the raccoon relies on non-visual senses became very apparent in the case of a raccoon recently taken in a live trap. Most trapped 'coons behave rather timidly or appear "unconcerned" until one tries to take them from a cage. But this individual charged the bars, hissed ominously and clicked his fangs audibly before the trapper "came in sight." Since there are many records of rabid raccoons, the trapper at first thought this disease might account for its strange antics. But examina-



tion revealed that his prisoner was blind.

Removing the raccoon from the trap presented a special problem. Ordinarily, the trapper places a bag over the opening, then shoos the animal into the bag by scaring it. But the blind 'coon could not see the bag, and reacted to the shouting and poking by more snarls and charges.

The trapper decided upon an ingenious idea: he placed the bag over the opening, then blew hard on the 'coon from the direction of the open bag. Feeling the breath of air, the animal ran toward it and into the bag.

Examination of the raccoon showed that it was an adult which had apparently been blind for a considerable length of time. Contrary to what you might guess, this animal was quite plump, well-fed and seemed in excellent health.

Thus, in spite of total blindness, the other senses of the raccoon were sufficient for it to make a good living in the wild, finding food and shelter and avoiding enemies. The non-typical charging and snarling were evident attempts to scare away potential enemies heard but not seen. His bluff served its purpose well.

This blind raccoon was marked by the trapper by clipping its toes in a distinctive manner. Its tracks as seen on the shore of the creek and on sandy trails will now furnish information on its activities. How long will this blind raccoon manage to hold its own? Will it stay in its well-known range, or will the raccoon move to other locations? The tracks will now reveal the future fate of a raccoon whose great handicap has not defeated the spunky animal.

Science News Letter, January 9, 1960